

Work Order ID 84380

84380

Page 1

May-30-12 8:00:39 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start

NS1

Revision ID: ~~U/R~~

Stop

NS2

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

F U R

OK QP 12/16/12

100

0.00

100

DC

DOCUMENT CONTROL

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG002

MJ 12/10/12

12/06/25

110

0.00

110

CNC Bend 1

BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

12-5-11

120

QC15- Crosstube Dimensional Check

0.00

120

QC

Memo

0.00

Quality Control

12-5-11

Issue P/O to MetCOR

P/O: 16954

12/10/12

12-5-11

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Thursday, May 10, 2012 4:26:52 PM

Item ID: D350-748-101

Accept

N9000040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

125

0.00

125

HandFXtube

Hand Finishing Crosstubes

Memo

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp:

Start time:

Finish time:

0.00

N/A

127

QC6- Inspect dimensions to drawing

0.00

127

QC

Quality Control

Memo

0.00

8/2/05/16

POSITIVE RECALL

EFFECTIVE 12/5/11 AUTH 9

RELEASED 12/6/18 DATE 12/6/18

FOR NARROW WIDTH

SEE ATTACHED
NUR

PTO

W/O: 84380

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.05.11	110	The 1st too narrow after bending	CP 12.05.11 Q51042	Stress relieve. Check width.	CP 12-5-17	TW 12-5-17	CP 12.05.11 Q51042	S 12/6/12

NOTE: Date & initial all entries

Handwritten text, possibly a signature or date, oriented vertically.

Handwritten text, possibly a signature or date, oriented vertically.

Handwritten text, possibly a signature or date, oriented vertically.

Handwritten text, possibly a signature or date, oriented vertically.

W/O: 84380

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.05.17	110	Tube is bent high	GP 12.05.17 PS1042	Cut to 23.40" Acceptable	MW 12-6-17	TH 12-6-17	GP 12.05.17 PS1042	12/6/17

NOTE: Date & initial all entries

22

100

100 of 100

100 of 100

100

100

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May-30-12 8:00:39 AM

Item ID:	D350-748-101	Accept	*N900040100*	Setup	Start	*NS1*
Revision ID:	U/R				Stop	*NS2*
Item Name:	Crosstube Installation, High Fwd					
Start Date:	5/10/12	Start Qty:	1.00	Cust Item ID:		
Required Date:	5/25/12	Req'd Qty:	1.00	Customer:		
Reference:						

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start	*NR1*
	QC:	Date:	SPC (Y/N):	Date:		Stop	*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes	1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-141								
	4-Remove all marks from tube within limits of D350-748-141								
	5- Apply a light coat of LPS3 on the interior of tube Batch: <i>MAE</i>								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

MO/Rm

12-5-23

12-5-24

8/2/05/30

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Thursday, May 10, 2012 4:26:52 PM

Item ID: D350-748-101

Accept

N900040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00

150

Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O:

17084

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

CZ 12/06/04 ①

160

Receive & Inspect for Damage & Mat'l Certs

0.00

160

Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

170

QC5- Inspect part completeness to step on W/O

0.00

170

QC

Memo

0.00

Quality Control

12/4/18
12-5-15
12/4/19NPT
acc'd

P/O: 17258

CZ 12/06/19 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.10.05	161	LOAD TUBE TO 3500 ^{lb} FOR 1 MINUTE. REF D.S. EMAIL.		CP 12/6/18	1	CP 12/6/18	
11.10.05	162	NDT TUBE.					

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

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Item ID: D350-748-101

Accept

N900040100

Setup Start *NS1*

Revision ID: U/R

Stop *NS2*

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180		0.00							
180	SprayPaint					1			m/12 06 20
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190		0.00							
190	QC14- Inspect Spray Paint					①	②	12-06-22	
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200		0.00							
200	Crosstubes					AB		12-6-22	
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

84380

May-30-12 8:00:39 AM

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 5/25/12 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

QC5- Inspect part completeness to step on W/O

0.00

210

QC

Memo

0.00

Quality Control

Pick Kit

0.00

220

Packaging

Memo

0.00

Packaging

QC4- 100% Inspect kits for completeness

0.00

230

QC

Memo

0.00

Quality Control

Work Order ID 84380

84380

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Item ID: D350-748-101

Accept

N900040100

Setup Start *NS1*

Revision ID: U/R

Stop *NS2*

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging								12/6/25
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-101								
	Location: _____								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

MW 12/6/25
MF
12-06-25

Picklist Print

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Page 1

Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC
 4.3 DD verf:EC
 IPP REV:F 10.08.04 added QSI010
 IPP REV:G ADD UNDER BEND COMMENT 12-05-28 JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225 Insert		Purchased	No			200	Each	819.0000	1	1		12-6-22	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST281		796							
				108696		146							
				110768		62							
				118386		55							
				118966		68							
				121269		465							
				ST282		23							
				120410		10							
				120451		13							
AN4-41A Bolt		Purchased	No			220	Each	539.0000	8	8		12-6-22	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				360		181							
				121185		181							
				ST360		358							
				115108		3							
				115705		7							
				118451		29							
				118838		50							
				119328		100							
				120423		150							
				121205		15							
				121573		4							

Picklist Print

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Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

AN4-6A Purchased No

220 Each 1,514.0000 16

16

Location	Loc Qty	Loc Code
355	222	
121631	222	
ST356	1292	
119017	792	
121243	500	

AN5-32A Purchased No

220 Each 245.0000 4

4

Location	Loc Qty	Loc Code
ST339	145	
119862	50	
120423	75	
120910	20	
ST340	100	
121541	100	

AN960JD10 WASHER1149D0363J Purchased No

200 Each 0.0000 1

1

12-6-22

AN960JD416 WASHER1149D0463J Purchased No

220 Each 30.0000 32

32

12/19/12

Location	Loc Qty	Loc Code
ST351	30	
116289	10	
119097	20	

AN960JD516 WASHER1149D0563J Purchased No

220 Each 0.0000 8

8

11/19/12 12/6/22

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May-30-12 8:00:39 AM

Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

D2856-400 Manufactured No 200 f 242.5445 1.181 1.2431579 12-6-22
Abrasion Strip

Location	Loc Qty	Loc Code
ST403	216	
81875	216	
ST409	26.5445	
63735	0.6696	
68076	0.3149	
71164	8.46	
79551	17.1	

D3500-1 Manufactured No 220 Each 75.0000 4
Saddle

Location	Loc Qty	Loc Code
ST423	14	
78595	14	
ST424	31	
73405	20	
73406	8	
76000	3	
ST425	30	
76940	30	

D3501-1 Manufactured No 220 Each 367.0000 16
Bushing

Location	Loc Qty	Loc Code
ST051	367	
67757	4	
73391	6	
74866	207	
77033	61	
81955	26	
83253	63	

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Page 4

Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

D3502-1 Manufactured No 200 Each 21.0000 2 2 AB 12-6-22
Support

Location	Loc Qty	Loc Code
ST051	21	
73419	11	
<u>74873</u>	10	

D350-748-141TRN Manufactured No 110 Each 3.0000 1 1
Crosstube Turning Detail

Location	Loc Qty	Loc Code
LG <u>79013</u>	3	
74718	1	
83277	1	
83278	1	

MS21042L4 Purchased No 220 Each 4,059.0000 24 24
Nut

Location	Loc Qty	Loc Code
ST300	4059	
119075	125	
121011	677	
<u>121444</u>	2957	
121652	300	

MS21042L5 Purchased No 220 Each 1,447.0000 4 4 slu/22
Nut

Location	Loc Qty	Loc Code
300	500	
121652	500	
ST300	947	
108827	8	
116105	5	
116548	43	
117611	18	
<u>119109</u>	865	
<u>17651</u>	8	

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Shop Packet Print

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Picklist Print

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Page 5

Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

MS21920-20 Purchased No

200 Each 86.0000

2

2

AL 12-6-22

Location	Loc Qty	Loc Code
LG050	86	
116799	8	
120676	8	
121067	20	
121274	50	

MS27039-1-10 Purchased No

200 Each 126.0000

1

1

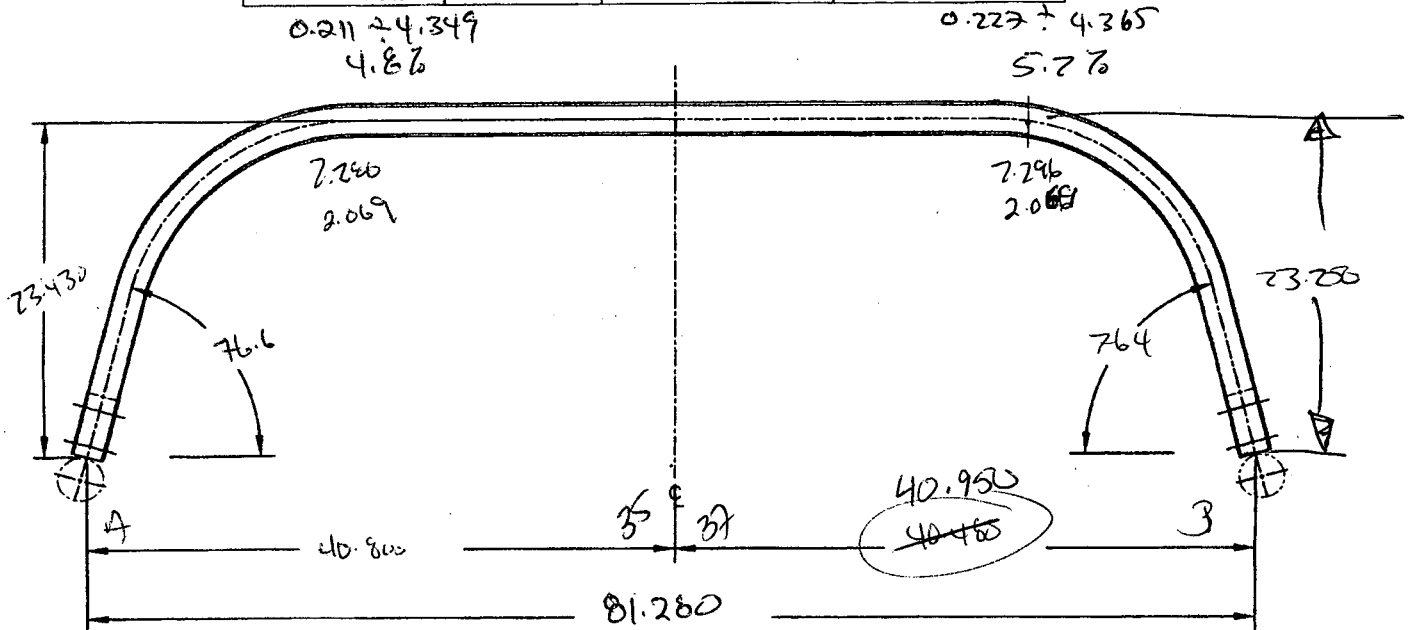
AL 12-6-22

Location	Loc Qty	Loc Code
GA	100	
120449	100	
ST291	26	
120120	26	

DART AEROSPACE LTD	Work Order:	8438
Description: Crosstube High Fwd (AS350/355)	Part Number:	D350-748-101
Inspection Dwg: D350-748-141	Rev: F	Page 1 of 1

Bend

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
SIDE A - 4.8% crushing @ 35 Passes
SIDE B = 5.2% crushing @ 37 Passes
twist = 0.054

QC15 Inspection	12.06.25
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

10/10/10

10/10/10

10/10/10

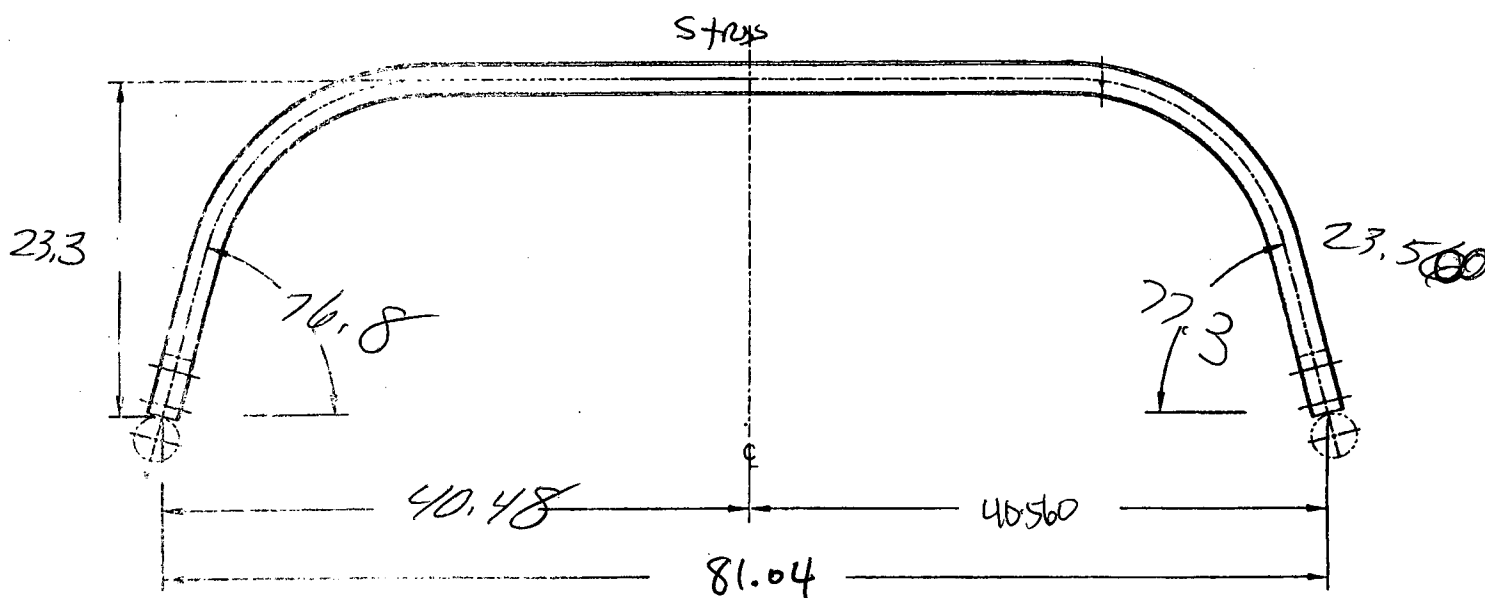
10/10/10

10/10/10

10/10/10

DART AEROSPACE LTD		Work Order: 84380
Description: Crosstube High Fwd (AS350/355)		Part Number: D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Twist 0.09
from 23.50" to 23.40" Acceptable per 05.17 per 10/12

QC15 Inspection	8
Date	12/06/26

Rev	Date	Change	Revised by	Approved
A	07.02.03	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

121 000

2402

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

84380

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

UNDER REVIEW

11.07.12

RELEASED
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.11.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-141	REV. F SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
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8 7 6 5 4 3 2 1

D

C

B

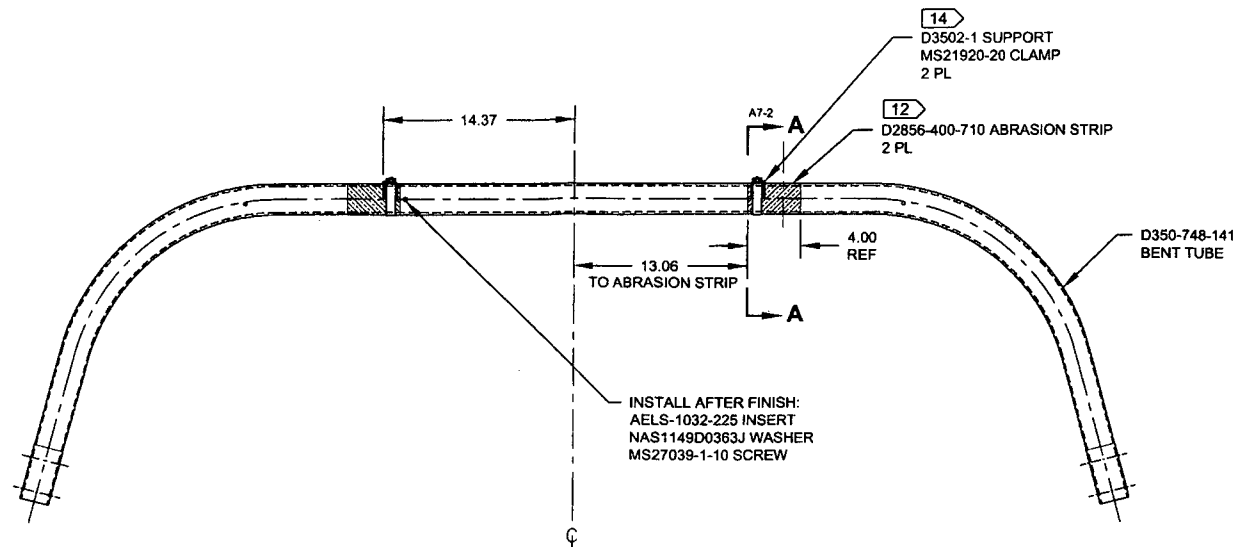
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D

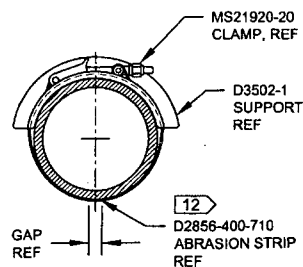
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B

A



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

UNDER REVIEW

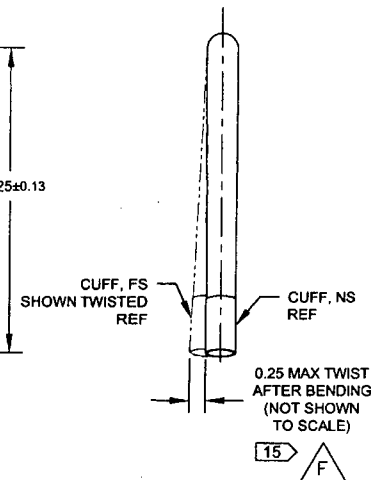
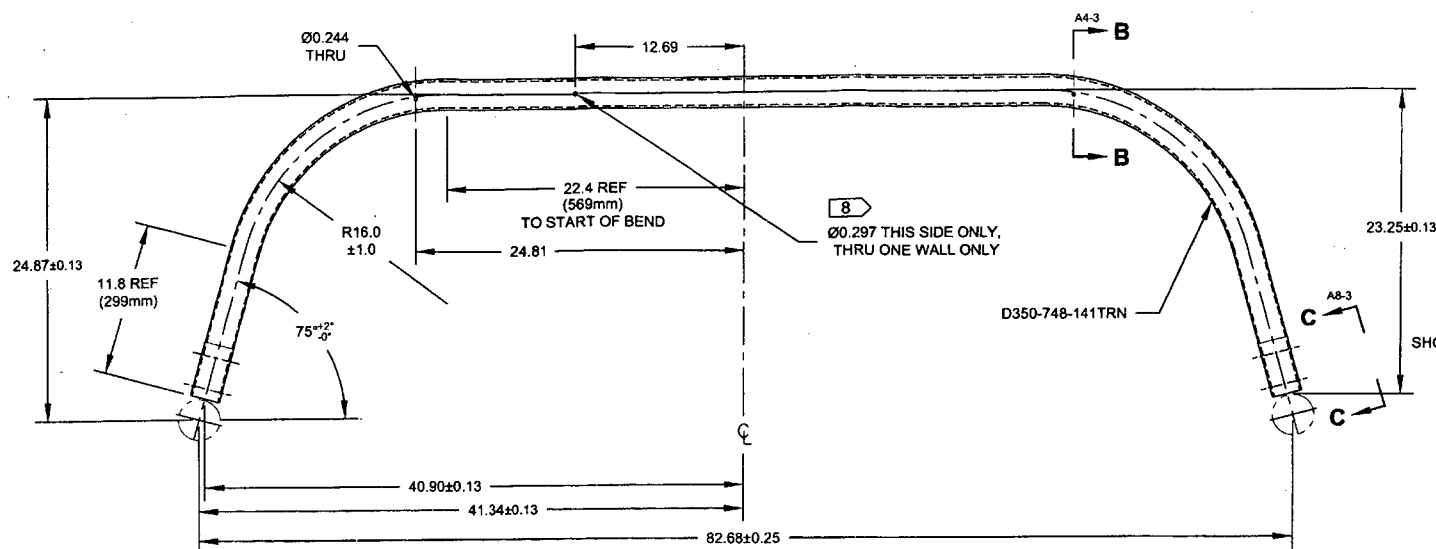
11-07-11

RELEASED
2011-01-29

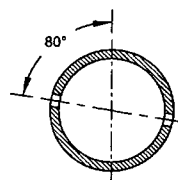
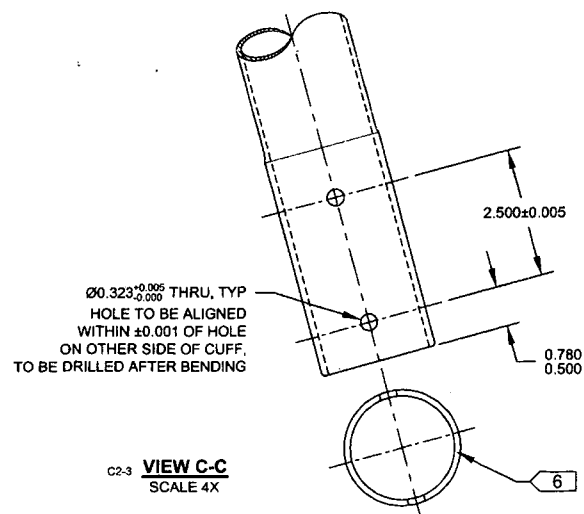
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D350-748-141	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
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8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1



D350-748-141
BENDING AND DRILLING DETAIL 10



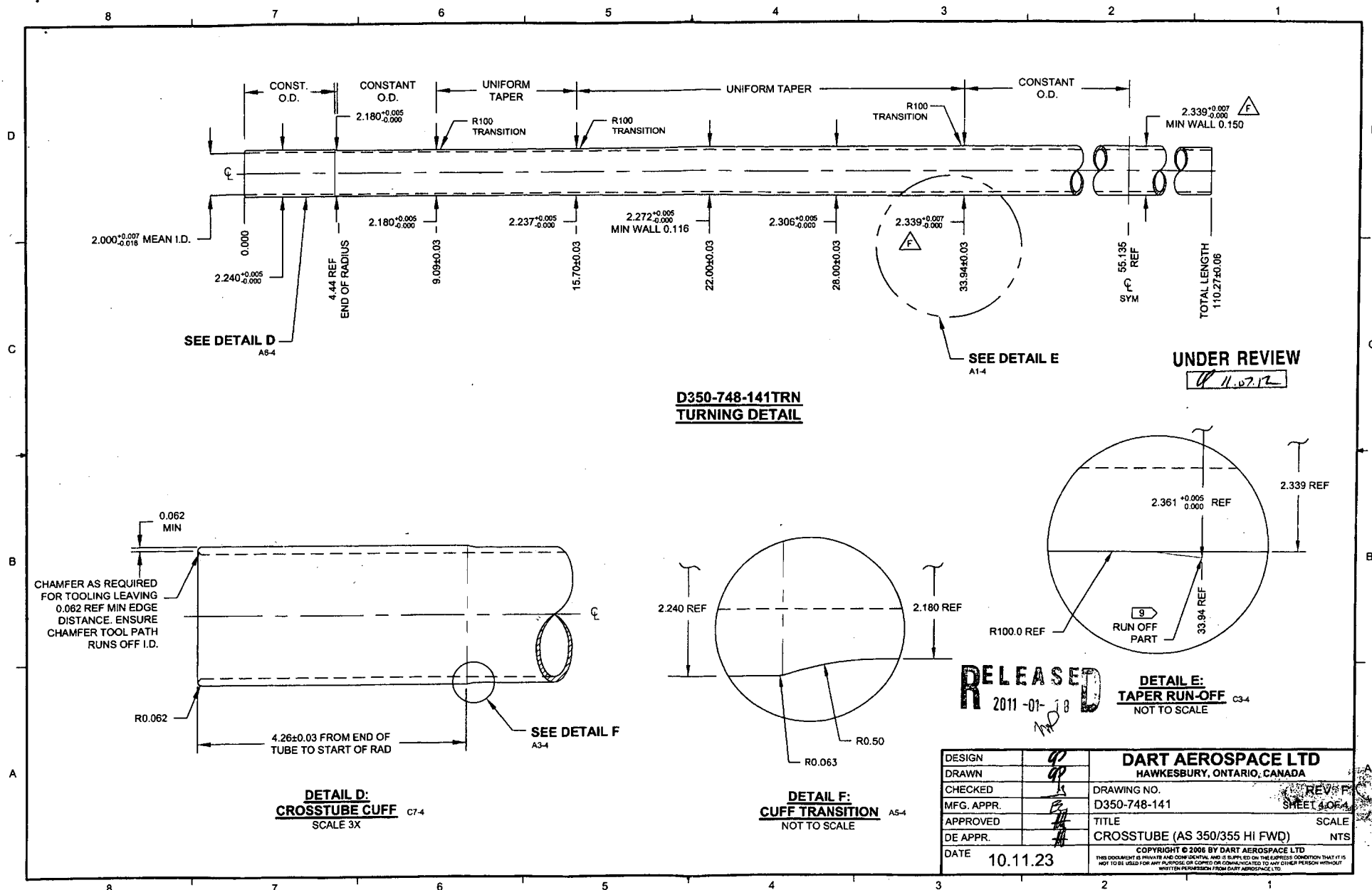
SECTION B-B D3-3
SCALE 4X

UNDER REVIEW
11.27.12

RELEASED
2011-01-18

DESIGN	97	DART AEROSPACE LTD	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED	1	DRAWING NO. D350-748-141	REV. F
MFG. APPR.	2	SHEET 3 OF 4	
APPROVED	3	TITLE	SCALE
DE APPR.	4	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

8 7 6 5 4 3 2 1





Metcor Inc.
560, boul. Arthur-Sauvé
St-Eustache (Québec) J7R 5A8
Tél.: 450-473-1884

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215
DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:
DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
16954		Steel		

SPÉCIFICATIONS DU PROCÉDÉ
processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results
Visual

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
7	210	D350-748-101 (1) CROSS TUBE (1) D350-748-101 CROSS TUBE (1) D350-748-101 CROSS TUBE (1) D350-748-101 CROSS TUBE (1) D350-748-101 CROSS TUBE (1) D350-748-101 CROSS TUBE CONTENANT: 1 PALETTE

Metcor Inc.
560, boul. Arthur-Sauvé
St-Eustache (Québec) J7R 5A8

Tél : 450 491-1884
Fax : 450 491-5493
e-mail : info@metcor.ca 450 491-6454

 **Metcor Inc.**

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE

1270 ABERDEEN

HAWKESBURY

ON K8A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE

1270 ABERDEEN

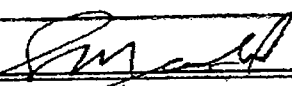
HAWKESBURY

ON K8A 1K7

1

COMMENTAIRES / COMMENTS

INSPECTEUR / inspector:




DATE: 2012-05-14

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-12-2012

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 114971
INVOICE #: 60875

**CONTRACT OR
PURCHASE ORDER #** PO17084

DESCRIPTION: CROSSTUBE

QTY 1

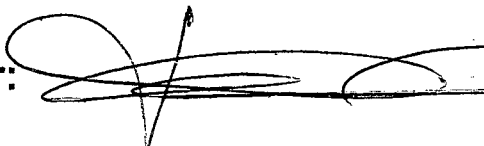

P/N # d350-748-101

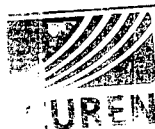
S/N # 84380

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

CERTIFICATE: I certify that the items indicated here on have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:



LIQUID PENETRANT TEST REPORT

P- 12188

PAGE 1 OF 1

CLIENT
ATTENTION
ADDRESS

DAI AeroSpace
MATT/LINDA
1270 ABERDEEN ST.
HAWKESBURY, ON

DATE
ACUREN JOB No.
PO/NO No.
WORK LOCATION
ACCEPTANCE STD

June 19/2017 TIME AM ☒ PM ☐
198-12-0265
1784
SAVE
ASTM 1417/651038 REV./DATE 2005

PROJECT
ITEM(S) EXAMINED

JOB DESCRIPTION

F.P.I. on cross tubes
SEE RESULTS
2008 TECHNIQUE No. LT 1417 REV./DATE 2008
MATERIAL 4130 STEEL THICKNESS VARIOUS

PART NO.
SCOPE

SEE RESULTS
A JET FLUORESCENT LIQUID PENETRANT EXAMINATION
WAS COMPLETED 100% ON EXTERNAL SURFACE

TEST DETAILS

METH. ☒ FLUORESCENT ☐ VISIBLE
FAMIL. BRAND MAGNAFLUX
PENETRANT 2LG7 MINIMUM DWELL TIME 45 MIN.
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN.
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN.
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☒ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F

RESULTS-

☒ METRIC ☐ IMPERIAL

W.O.#s - CROSS TUBES.

1	-	"	"	83701	✓
1	-	"	"	83699	✓
1	-	"	"	83698	✓
1	-	"	"	81517	✓
1	-	"	"	81519	✓
1	-	"	"	84380	✓

120619

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly to that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, express or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

Matthew Murdoch

PRINT

SIGNATURE

TECHNICIAN (SIGNATURE):

Mike Lattin

1ST TECHNICIAN

2ND TECHNICIAN

NAME (PRINT):

CGSB LEVEL 1 SNT LEVEL 6
CGSB REG. No. 60606

CGSB LEVEL 1 SNT LEVEL 6
CGSB REG. No. 60606

REPORT

REVIEWED BY:

NAME

DTR # E 63501

CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY